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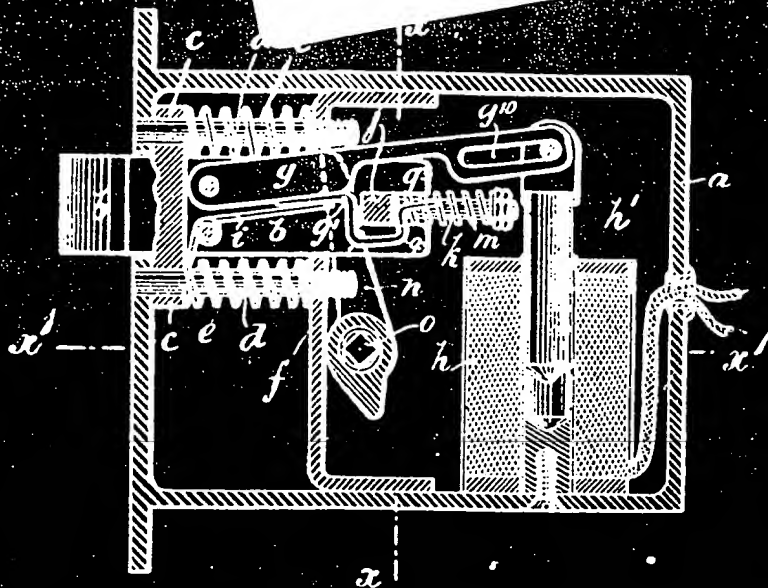
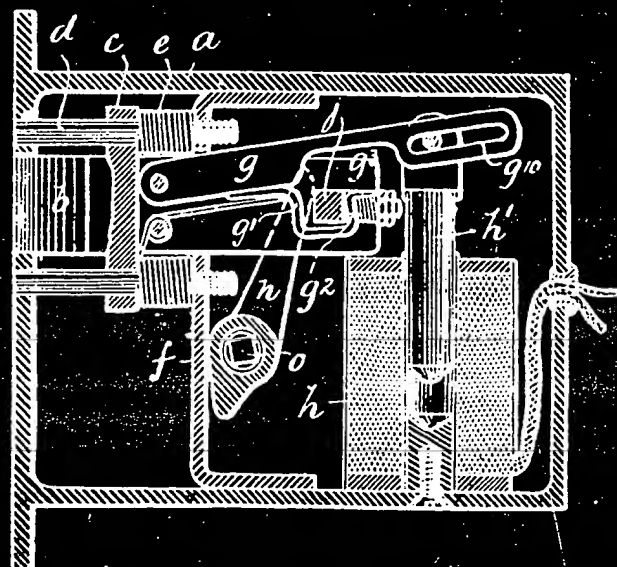


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]

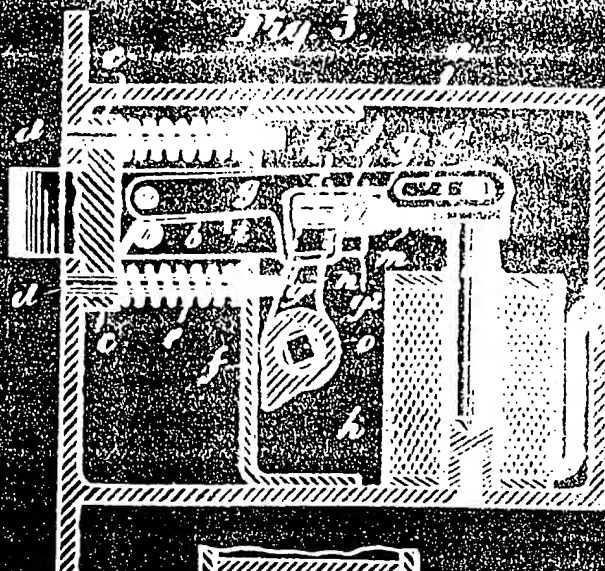


Fig. 4.

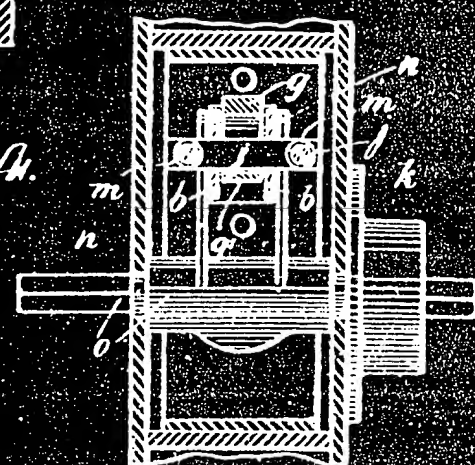


Fig. 5. a. h. h'

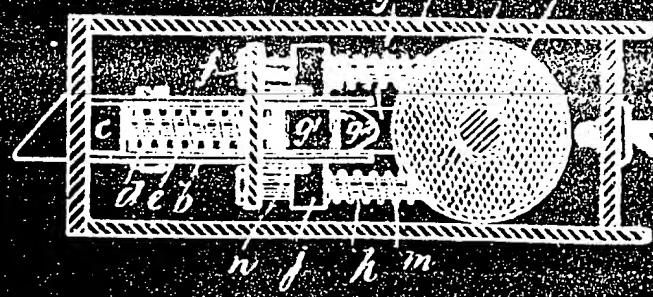


Fig. 6.

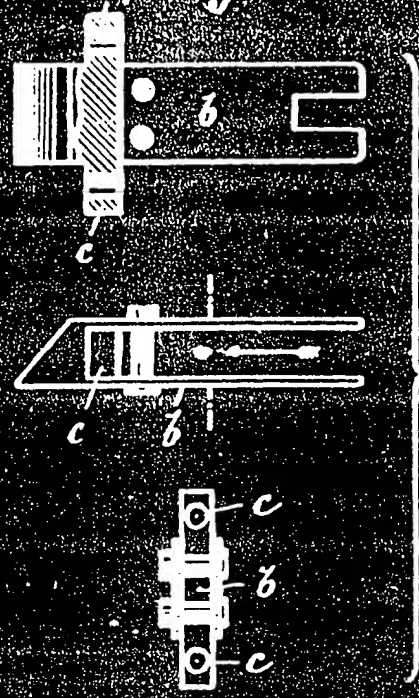


Fig. 7.

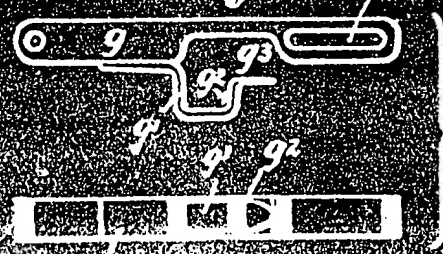
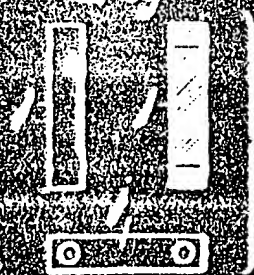


Fig. 8.



N^o 5427



A.D. 1911

Date of Application, 4th Mar., 1911

Complete Specification Left, 4th Sept., 1911—Accepted, 25th Jan., 1912

PROVISIONAL SPECIFICATION.

Improvements in, and relating to, Electrically-controlled Fastenings for Railway-carriage and other Doors.

I, CHARLES RUPERT ALLEN, of 77, Newman Road, Erdington, near Birmingham, Electrical Engineer, do hereby declare the nature of this invention to be as follows:—

This invention has reference to electrically-controlled locks or fastenings for doors, and to controlling and indicator arrangements for use in connection with such fastenings, and the improvements are principally applicable to railway carriage and like vehicle doors for the purpose of preventing passengers entering or leaving the vehicle whilst in motion, as well as for preventing a passenger alighting from the wrong side of a train when the latter is standing in a station, and also for preventing a person entering or leaving a train or vehicle when stationary between authorized stopping places; but the invention may also be applied for the electrical control of door and analogous fastenings for various other purposes.

My invention, as applied to the control of the door fastenings of a railway train, provides a system wherein the locks or fastenings on both sides of the whole of the passenger compartments of the carriages in a train are controlled by master switches operated by the doors of the guards van in such a manner that none of the carriage doors on either side can be opened except when the guards van door on the corresponding side of the train is opened, or except when the controlling circuit is broken by a hand-operated switch situated in the guards van or other officials compartment.

In the case of a train fitted with an electric lighting-system, the current for controlling the door fastenings may conveniently be taken from the lighting batteries without materially increasing the load on such batteries, although, if necessary, an independent generating arrangement may be fitted to provide the necessary current to control the fastening, and also to operate an electric alarm system for indicating to the guard or other official if any one of the carriage doors is not properly closed when the train commences to move.

According to my invention I propose to fit each of the passenger compartment doors with a lock or fastening in which the bolt is normally maintained in its closed or fastening position by suitably applied springs, whilst between this bolt and its operating handle, there is provided an electro-magnetic clutch, or an electrically-controlled mechanism actuated by a solenoid or electro-magnet enclosed in the lock casing, and so arranged that the said bolt can only be withdrawn from its fastening position when and after the energising circuit of the clutch has been broken, either by the opening of the controlling or master switch in connection with the guards van door or otherwise, whereas when the clutch is closed, the magnetic system operates to disengage the clutch between the handle and bolt so that if the said handle should be then operated, it simply makes an idle movement and no motion is transmitted to the bolt, which is retained by its springs in its locked or fastened position.

A suitable construction of lock or fastening adapted for use in connection

[Fig. 1.]

80 3257. A.D. 1911.

Magnetically controlled Locking for Railway-carriage & other Doors.

A carriage within a suitable casing a horizontally sliding bolt 5
is suitably guided with guide rods resting upon a pair of guide rods fixed
transversely and parallel with the said bolt. These guide rods are encircled
by a coil of wire which is connected against suitable abutments on a
rod passing through the casing, whose outer ends act against the guide 10
rods on the bolt and normally tend to maintain the said bolt in its shot or
locking position. Pivotally mounted upon the side of the said bolt, and
extending outwards, is a long arm or clutch lever whose rearward end is
connected with a coil which is of a length equal to the full range of movement of
the bolt, and is engaged by a core on the upper end of the core or plunger of a 15
controlling magnet so that the bolt can make its sliding movement relative to
the casing without disturbing the connection between the clutch lever and the
magnet. The magnet is disposed in a vertical position below the horizontal bolt,
and is suitably wired in the bolt controlling circuit. The clutch lever and 20
extending plunger are both influenced by a suitably applied spring tending to lift
the clutch lever into a position which admits of the bolt being withdrawn when the
magnet is de-energized.

The inner end of the bolt may be forked or slotted to provide a clearance for
the reception of an intermediate slide which is mounted upon and is slidable 25
along an independent guide rod suitably fixed in the casing, and is acted upon by
a spring coiled or other spring which tends to keep one side of the said slide
in contact with a tumbler lever or arm on the spindle of the handle or hand-
operating turn of the lock; this spindle being directed transversely through the
casing below the bolt, and in such relationship to the other parts that the
turning of the handle in the unlocking direction imparts an inward movement 30
of the intermediate slide. The side of the slide furthest from the tumbler arm
may be suitably chamfered or bevelled, and is adapted, when the magnet
coil is de-energized, to engage with a corresponding shoulder or abutment on the
magnetically controlled clutch-lever.

Thus, when the controlling circuit of the lock is broken (such as by the master 35
switches the opening of the guard van door) the spring of the clutch lever lifts
the lever, together with the extending plunger, into a position in which the
plunger - the said lever engages behind the intermediate slide so as to estab-
lish connection between the handle and the bolt and admit of the said bolt being
withdrawn to unfasten the door on the handle being turned. But when the coil 40
is energized, the plunger is drawn downwards and thereby rocks or depresses
the clutch lever into a position in which its shoulder is clear of the intermediate
slide. The connection between the handle and bolt is thus broken electrically,
and the bolt is maintained in its fastened position by its springs, and if the
handle should be turned, its tumbler arm merely moves the intermediate slide 45
without affecting the bolt. And the various parts remain in these positions
until a controlling switch is closed by the opening of the master switch.

The magnets of the various locks on both sides of a train may be wired up
with the batteries or other source of power and with the controlling switches in
such a manner that the same source of power may be used for the locks on both sides of 50
the train, and the opening or closing of either one of the doors of
the train may be controlled only the carriage locks on the
other side of the train.

The magnets may be connected in connection with the van doors,
so that when the van doors are opened, the magnets are de-energized and the locking magnets remain 55
in their locking position. This enables a guard to
open the van doors without releasing the carriage locks in the event of a
derangement of the magnets between stations or other authorized stopping places.
The system is constructed that, in the event of any derange- 60
ment of the electrical parts or of the controlling system, the clutch lever is
spring-loaded into the position in which it engages with the handle-

Impts. in Electrically-controlled Fastenings for Railway-carriage & other Doors.

operated slide so that the lock can then be opened by means of the handle in the usual way.

As an alternative arrangement, the magnet and clutch lever may be so applied that the action is the converse to the one above described. That is to say, the energising of the solenoid operates to pull the clutch lever into position for establishing connection between the external handle and the bolt, so that (contrary to what obtains in the previously described arrangement) the lock can only be unfastened when the controlling circuit is closed.

For the purpose of indicating to a guard if any door of a train is not properly closed when the train commences to move, I may arrange in conjunction with the locking system, a bell circuit in connection with every compartment door of the train; the bell being fixed inside the guards van so that if any door or doors is or are left open inadvertently the bell commences and continues to ring until such door is properly closed. For this purpose, I may arrange in connection with each carriage door, a push or other switch, in suitable circuit with the bell and with a push or other switch actuated by the guards van door, but these switches have reversed actions and are arranged so that the carriage door switch breaks the bell circuit when the door is closed and only makes it when said door is open, whereas the van switch breaks the circuit when the van door is opened and makes the circuit when said door is closed. Thus the bell circuit is completed only when a carriage door is opened at a time when the van door is shut so that under ordinary conditions the bell only rings to indicate an improperly closed door when the train is in motion.

Dated this 3rd day of March, 1911.

25

CHARLES RUPERT ALLEN.

By Arthur Sadler,
57, Colmore Row, Birmingham,
Agent for Applicant.

COMPLETE SPECIFICATION.

30 *Improvements in, and relating to, Electrically-controlled Fastenings for Railway Carriage and other Doors.*

I, CHARLES RUPERT ALLEN, now residing at 67, Slade Road, Gravelly Hill, Birmingham, and formerly of 77, Newman Road, Erdington, near Birmingham, Electrical Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to electrically-controlled locks or fastenings such as may be used in connection with electrical systems for controlling the door fastenings of railway trains wherein the locks or fastenings on both sides of the passenger compartments of a train are under the control of master-switches operated either by the doors of a guards van, or by hand, in such a manner that 40 one of the carriage doors on either side can be opened, except when the guards van door on the corresponding side of the train is opened, or except when the controlling circuit is broken by the hand switch which is situated in the guards van or other officials compartment.

The improved lock or fastening is of the type wherein a spring-engaged sliding bolt or equivalent part is adapted to be withdrawn by hand-operated mechanical devices which are inoperative when the electrical controlling circuit of the system is closed, but which are rendered operative on the breaking of the said 50 circuit so that the door may then be opened: and the principal object of the

Impts. in Electrically-controlled Fastenings for Railway-carriage & other Doors.

present invention is to provide an improved and efficient solenoid-control mechanism for connecting and dis-connecting the sliding bolt to and from an external handle or operating lever, whilst another object is to provide a self-contained lock of the type referred to, which is adapted to be substituted for existing carriage locks and connected up with an electrical control without involving any structural alteration in the doors or other parts of the carriages.

Figure 1 of the accompanying drawings represents a sectional elevation of an electrically-controlled door-lock constructed in accordance with my invention and adapted for use in connection with a control system such as herein referred to. This view shows the parts in the positions they assume when a door is fastened by the lock, but the controlling circuit is broken so that the bolt can be withdrawn for opening the door when the handle of the lock is turned.

Figure 2 is a similar view to Figure 1, but shows the bolt, and parts associated therewith, in the positions they assume when the handle is turned and the bolt withdrawn.

Figure 3 is another view similar to Figure 1, but shows the position assumed by the clutch lever when the controlling circuit is closed, in addition to illustrating how the releasing handle can be turned—when the clutch lever is so positioned—without transmitting motion to the bolt which is held in its shot position by its springs.

Figure 4 is a transverse vertical section of the lock taken upon the dotted line *x* Figure 1, and Figure 5 is a horizontal section thereof upon the dotted line *x'*.

Figure 6 is an elevation, plan and vertical section of the lock-bolt separately.

Figure 7 is an elevation of the clutch lever, and

Figure 8 is a plan, elevation and section of the intermediate slide which is carried by the bolt, and wherethrough movement is transmitted from the handle to the clutch lever and thence to the bolt, on the said handle being turned when the controlling circuit is broken.

The same letters of reference indicate corresponding parts in the several figures of the drawings.

In the lock shown in Figures 1 to 8, there is arranged within a suitable casing *a*, a horizontally-sliding bolt *b*, furnished with guide pieces *c*, working upon a pair of guide-rods *d*, fixed in the said casing and disposed above and below and parallel with the said bolt. These guide rods are encircled by coiled springs *e*, whose inward ends thrust against suitable abutments on a fixed bearer *f*, inside the casing, whilst their outer ends act against the guide pieces on the bolt and normally tend to maintain the said bolt in its shot or fastening position as shown in Figures 1 and 3. Pivotaly mounted upon the said bolt and adapted to slide with it, is a long arm or clutch lever *g*, whose rearward end is formed with a slot *g'*, which is of a length equal to the full range of movement of the bolt and is engaged by a stud on the upper end of the core or plunger *h* of a controlling magnet *A*, so that the bolt can make its sliding movement relative to the magnet without affecting the connection between the clutch lever and the plunger. The magnet is disposed in a vertical position below the horizontal bolt, and is suitably wired in the bolt-controlling circuit. The clutch lever and the solenoid plunger are both influenced by a spring *i*, tending to lift these parts into the position shown in Figures 1 and 2 which admits of the bolt being withdrawn when the magnet is de-energised.

The inner end of the bolt is forked or slotted to provide a clearance for the reception of an intermediate slide *j*, which is mounted upon and is slidable along independent guide rods *k*, suitably fixed in the casing, and is acted upon by separate springs *m*, which tend to keep one side of the said slide in contact with the tumbler levers or arms *n*, on the spindle *o*, of the handle or hand-operated turn of the lock; this spindle being directed transversely through the casing, below the bolt, and in such relationship to the other parts that the turning of the handle in the unfastening direction imparts an inward movement to the intermediate slide.

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The lever g , is furnished on its underside, with an arm or attachment g^1 , formed so that the front part g^2 constitutes a shoulder or abutment for the slide j , whilst above the shoulder there is a gate or clearance g^3 , between the lever g , and arm g^1 , to provide for the idle movement of the slide in the event of the handle being turned when the controlling magnet is energised.

Thus, when the controlling circuit of the lock is broken (such as by the master switch on the opening of a guards van door) the clutch lever g , together with the solenoid plunger, is lifted by the spring i , into the position shown in Figures 1 and 2, wherein the shouldered arm on the said lever engages behind the intermediate slide so as to establish connection between the handle and the bolt and admit of the said bolt being withdrawn (as shown in Figure 2) to unfasten the door on the handle being turned. But when the coil is energised (such as by the closing of the guards-van door) the plunger is drawn downwards and thereby rocks or depresses the clutch lever into the position shown in Figure 3, in which the shoulder g^2 is clear of the intermediate slide. The mechanical connection between the handle and bolt is thus broken electrically, and the said bolt is maintained in its fastened position by its springs, whereas if the handle should be turned, its tumbler arms merely move the intermediate slide, which travels idly through the gate or clearance g^3 , without transmitting any movement of the bolt. And these conditions are maintained until the controlling circuit is broken.

When improved locks such as above described are applied to railway carriages, the magnets of the various locks on both sides of the train may be wired up with batteries or other source of power, and with the controlling switches, by any suitable system of connections.

And with a lock constructed as described, in the event of any derangement of the electrical parts or in the controlling system, the clutch lever is automatically taken, by its spring, into the position in which it engages with the handle-operated slide, so that the lock can then be unfastened by means of the handle in the usual way.

As an alternative arrangement, the magnet and clutch lever may be applied so that the action is the converse to the one above described. That is to say, the energising of the solenoid operates to pull the clutch lever into the position for establishing connection between the external handle and the bolt so that (contrary to what obtains in the previously-described arrangement) the lock can only be unfastened when the controlling circuit is closed.

The said locks are adapted to be fitted in carriage or like doors in substitution of the ordinary locks or fastenings, and may be constructed so as to be readily interchangeable with such ordinary locks, but if desired, and especially when fitting the electrically-controlled locks to carriages already provided with ordinary fastenings, said locks may be fitted into the frames or jambs of such doors.

I wish it to be understood that the constructional details of the lock represented in the drawings may be varied without departing from my invention, as, for instance, instead of the lever of the clutch arrangement having an attached arm as shown to serve as an abutment for the tumbler-actuated slide, the said lever may be formed with a slot wherein the said slide works, and which is provided with a step or shoulder to make an abutment for the said slide whilst the part of the said slot beyond or inwards of the said shoulder is formed to constitute the gate or clearance wherethrough the slide makes its idle motion in the event of the external handle being turned when the controlling circuit is closed.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

First:—An improved electrically-controlled lock or fastening for railway carriage and other doors, comprising a spring-influenced bolt carrying a

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solenoid-controlled clutch lever or arm, and a slide adapted to be actuated by an external handle: the said clutch lever having an abutment for the slide, and a gate or clearance, which provide respectively for the connection of the bolt with the handle through the slide and clutch lever, and for an idle or inoperative movement of the said slide, according to the relative positions occupied by the said lever and slide as determined by the controlling solenoid, substantially as described. 5

Secondly:—An electrically-controlled lock as represented in the drawings, comprising a bolt influenced by springs tending to maintain the same in its "shot" position, a clutch-lever or arm pivoted to the bolt and connected with the plunger of a controlling magnet, a spring acting to lift the lever and plunger when the coil is de-energised, a slide directly actuated from the lock handle, and a shoulder or abutment for the said slide, so arranged that when the said lever is held in one position by the action of the magnet, the slide may be moved through a gate or clearance without affecting the bolt when the operating handle is turned, whereas when the said magnet is de-energised, the abutment is brought into engagement with the slide and connection is established between the said bolt and operating handle, all for the purposes as herein set forth. 10 15

Dated this 2nd day of September, 1911.

CHARLES RUPERT AILEN. 20

By Arthur Sadler,
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